

## **ABSTRACT**

**[0084]** Different periods of an ALD cycle are performed using different purge flows and, in some cases, different pumping capacities, while maintaining the reactor chamber at a nominally constant pressure. The purge flows may, in some cases, utilize different gasses and/or may be provided through different flow paths. These operations provide for ALD cycle time improvements and economical operation with respect to consumables usage. In some embodiments the use of an annular throttle valve provides a means for controlling downstream flow limiting conductances in a gas flow path from the reactor chamber.